Ex 1 LINEARIZAÇÃO de $f(x) = \cos(x)$

$$\Downarrow$$

$$f(x) = \cos \bar{x} - \operatorname{Sen} \bar{x} \cdot (x - \bar{x})$$

Com $\bar{x} = 0$ temos:

$$\hookrightarrow f(x) = \cos(0) - \operatorname{Sen}(0) \cdot (x)$$

$$\Downarrow$$

$$f(x) = 1$$

Com $\bar{x} = \frac{\pi}{4}$ temos:

$$f(x) = \cos \frac{\pi}{4} - \operatorname{Sen} \frac{\pi}{4} \left(x - \frac{\pi}{4} \right)$$

$$\Downarrow$$

$$f(x) = \frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} x + \frac{\sqrt{2}\,\pi}{8}$$

Ex 2:

$$F(t) \equiv m\dot{v} + m\dot{r}u - m x\dot{r} = f(u, \dot{v}, r, \dot{r}, x)$$

$$f(u, \dot{v}, r, \dot{r}, x) = f(\bar{u}, \bar{\dot{v}}, \bar{r}, \bar{\dot{r}}, x) + *$$

$$* = \frac{\partial f}{\partial u}\Big|(u-\bar{u}) + \frac{\partial f}{\partial \dot{v}}\Big|(\dot{v}-\bar{\dot{v}}) + \frac{\partial f}{\partial r}\Big|(r-\bar{r}) + \frac{\partial f}{\partial \dot{r}}\Big|(\dot{r}-\bar{\dot{r}}) + \ldots$$

$$\frac{\partial f}{\partial x}\Big|(x-\bar{x}) \quad \Rightarrow \quad \text{Como } \bar{\dot{v}}, \bar{r} \text{ e } \bar{\dot{r}} = 0 \text{ temos}$$

$$-m\bar{u}\dot{r} + m\bar{x}\dot{r} + F(t) = m\dot{v}$$